

**REMARKS**

Upon reviewing this application, it has come to the attention of the undersigned that all of the prior art which was timely and properly made of record in this case has not been substantively considered by the Examiner. Specifically, the Applicant prepared and timely filed an Information Disclosure Statement, along with PTO Form 1449 and copies of the necessary citations (a copy of the returned postcard, the submitted Statement and PTO Form 1449 is attached, if copies of the citations are again required, please immediately contact the undersigned), under a July 11, 2001 Express Mailing Date. The Examiner has not confirmed to the undersigned, by signing and returning a copy of PTO Form 1449, that such references were substantively considered. Accordingly, the Applicant respectfully requests the Examiner consider the same at this time.

Claims 79 and 80 (now claims 150 and 151, respectively) are objected to for containing informalities. The present amendment to the claims corrects these informalities.

Claims 102, 107, 111 and 112 (now claims 173, 178, 182 and 183, respectively) are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the reasons noted in the official action. The rejected claims are accordingly amended, by the above claim amendments, and the presently pending claims are now believed to particularly point out and distinctly claim the subject matter regarded as the invention, thereby overcoming all of the raised § 112, second paragraph, rejections. The entered claim amendments are directed solely at overcoming the raised indefiniteness rejections and are not directed at distinguishing the present invention from the art of record in this case. With regard to the Examiner's rejection of claims 111 and 112 because of the term "spatially delimited," the present amendment to the claims replaces that phrase with the more common term "spatially delocalized." As there is a known relationship between delocalized bonding and conductive surfaces, it is respectfully submitted that the claims as amended (now claims 182 and 183) fully comply with 35 U.S.C. § 112.

Claims 56-96 and 100-126 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Meade et al. '369 in view of Vermeglio et al. Claims 97-99 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Meade et al. '369 in view of Vermeglio et al., further in view of Harmer et al. '294. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the following remarks.

New claim 127 (previously claim 56) defines a nucleic acid oligomer attached to a redox-active moiety, the redox-active moiety having an electron-donor molecule and an electron-acceptor molecule which are not joined by a nucleic acid oligomer.

Meade et al. '369 discloses nucleic acid oligomers which are modified by covalent attachment of redox active compounds (such as transition metal complexes or organic electron donors or acceptors, e.g., riboflavin, quinones and porphyrins). The nucleic acid oligomers may be bound to an electrode thereby allowing electrons to be transported directly to the electrode via a covalent bond between the electrode and the nucleic acid. The presence of double-stranded DNA can be determined by comparing the electron transfer rates of the non-hybridized sample and of the hybridized sample.

It can be readily appreciated that the claims of the present invention and the disclosure of Meade et al. '369 are not only dissimilar, but are mutually exclusive. The claims of the present invention define a nucleic acid oligomer attached to a single redox-active unit (which contains an electron donor molecule and an electron acceptor molecule), while Meade et al. '369 discloses a nucleic acid oligomer modified by covalent attachment of two redox-active units, one electron donor molecule and one electron acceptor molecule. This distinction is further emphasized by the limitation in the present claims that the electron-donor molecule and the electron-acceptor molecule are **not** joined by a nucleic acid oligomer.

Accordingly, Meade et al. '369 neither discloses nor suggests a nucleic acid oligomer modified by a donor-acceptor complex as defined by the present claims.

Attached hereto, for the Examiner's review, are Appendices A and B, schematically depicting the subject matter of the present invention (Appendix A) and the subject matter of Meade et al. '369 (Appendix B). As described in the specification (including the originally filed drawings and claims), Appendix A illustrates an oligonucleotide modified by a single redox-active moiety which includes one electron-donor molecule (Donor) and one electron-acceptor molecule (Acceptor). Appendix B illustrates the oligonucleotide of Meade et al. '369, which is modified by: 1) a redox-active molecule (Donor, but might as well be the acceptor); and 2) an electrode (Electrode = Acceptor, but might as well be the donor).

It is respectfully submitted that Appendices A and B are simply schematic representations of the disclosures of the present invention and the Meade et al. '369 reference, and that no new matter is contained therein. If the Examiner deems it appropriate, the Applicant consents to adding these figures to the description.

With regard to the secondary references, the Examiner states that Vermeglio et al. teaches "the modified nucleic acid oligomer, wherein the redox-active moiety is the native or modified reaction center of photosynthesizing bacteria." The undersigned respectfully disagrees.

Vermeglio et al. provides an overview on the interactions and the organization of different electron transport chains of purple nonsulfur photosynthetic bacteria. It is appreciated that the reaction center of photosynthesizing bacteria was known in the art prior to the priority date of the present application. However, it was not known to attach the reaction center to an oligonucleotide.

A thorough review of Vermeglio et al. indicates that the document does not contain any of the terms "oligonucleotide," "nucleic acid" or "nucleic acid oligomer." Additionally, the term "DNA" is used only once, on page 290, right column, line 13 which reads "[t]he primary structure of Cyt c<sub>y</sub> has been determined by sequencing of a complementary DNA fragment." Accordingly, a nucleic acid oligomer modified by attaching a redox-active moiety is neither disclosed nor suggested by Vermeglio et al.

The Harmer et al. '294 patent cited by the Examiner concerns abrasive articles. The subject matter of Harmer et al. '294 is far remote from the present invention as well as from the subject matter of Meade et al.'369 and Vermeglio et al. A person having ordinary skill in the art trying to improve the system of Meade et al. '369 would certainly not look to prior art concerned with abrasive articles as a source of information. In order to rely on a reference as a basis for rejection of the Applicant's invention, the reference must either be in the field of the Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. See *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986). As it is neither, Harmer et al. '294 constitutes non-analogous art and has been inappropriately applied against the claims of the present invention.

Accordingly, none of the references cited by the Examiner, either alone or in combination, discloses or suggests a nucleic acid oligomer modified by a redox-active unit in which the redox-active unit, as required by independent claim 127 (formerly claim 56) of the present application, contains at least one electron donor molecule and at least one electron acceptor molecule.

The remaining dependent claims set forth various other features which further distinguish the presently claimed invention from the applied art of Meade et al. '369, Vermeglio et al. and/or Harmer et al. '294.

In view of this presently claimed feature, it is respectfully submitted that none of the art of record, either alone or in any permissible combination with one another, is sufficient to support a § 103 (obviousness) rejection. Thus, all of the raised rejections in view of Meade et al. '369, Vermeglio et al. and Harmer et al. '294 should be withdrawn at this time.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejection(s) should be withdrawn at this time. If the Examiner disagrees with the

Applicant's view concerning the withdrawal of the outstanding rejections or applicability of the Meade et al. '369, Vermeglio et al. and/or Harmer et al. '294 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejections should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

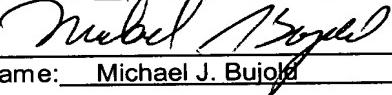
In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,

  
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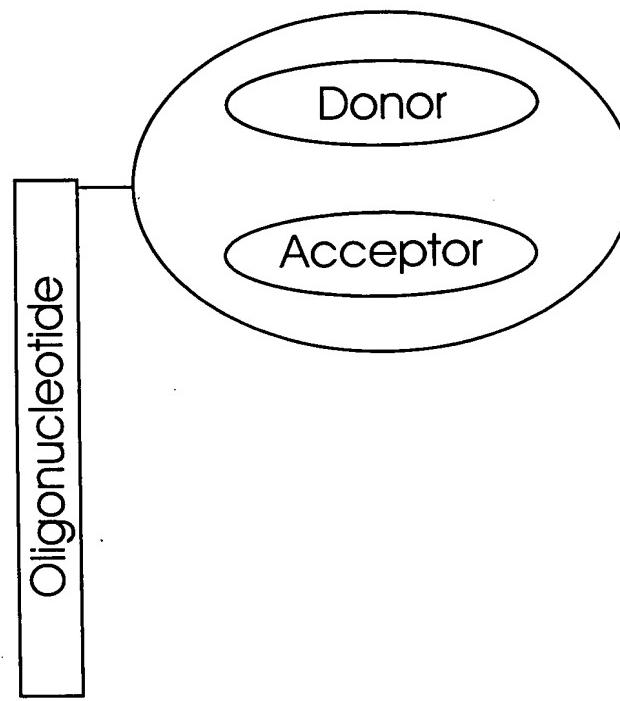
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By:   
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APPENDIX A





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## APPENDIX B

